Varieties of Hurford Disjunctions [*]

Paul Marty
University College London

Jacopo Romoli
University of Bergen

Abstract Hurford (1974) observed that a disjunction is generally infelicitous if one of the disjuncts entails the other, e.g., #*John lives in Paris or he lives in France*. Several accounts of Hurford's observation have been put forward in the literature, grounding the infelicity of these so-called Hurford disjunctions into different principles of language use such as Logical Integrity (Anvari 2018, 2019), Mismatching Implicatures (Singh 2010, Meyer 2014), Non-Redundancy (Katzir & Singh 2013) or Non-Triviality (Schlenker 2009). In this paper, we investigate three variants of Hurford's original case: (i) Hurford Disjunctions embedded in a downward entailing environment, e.g., #*Everyone who lives in Paris or in France likes bread*, (ii) felicitous disjunctions which we call Quasi-Hurford Disjunctions e.g., *John lives in Paris or somewhere else in France* and their clausal variants, e.g., *John lives in France, or he lives in France but not in Paris*, and (iii) disjunctions with extra constituents intervening between the entailing and the entailed disjuncts, e.g., #*John lives in France, or (else) he lives in London or in Paris*, which we dub Long-Distance Hurford Disjunctions. We show that none of the four accounts above captures all at once Hurford's original case and the three variants above. As we discuss, the molecular approach by Chierchia (2009) and Katzir & Singh (2013) and the exhaustification-based approach by Mayr & Romoli (2016) can be combined with either the Non-Redundancy or the Non-Triviality to help with the overgeneration issues with Quasi-Hurford Disjunctions. As we show, however, the resulting theories can no longer account for the infelicity of Long-Distance Hurford Disjunctions. We conclude by summarizing the challenges raised by our data for existing approaches to informational oddness and, more broadly, for the descriptive generalization originally proposed by Hurford.

Keywords: Hurford disjunctions, implicatures, triviality, redundancy, theories of oddness

Contents

1 Introduction

Consider the following minimal pairs:[1]

(1) **HD vs. QHD**

    a.   #John lives in Paris or in France.   HD

    b.   John lives in Paris or somewhere else in France.   QHD

(2) **HD vs. QHD in DE-environments**

    a.   #Everyone who lives in Paris or in France likes bread.   HD

    b.   Everyone who lives in Paris or anywhere else in France likes bread.   QHD

The (a)-sentences sound quite odd while their (b)-variants sound perfectly natural. Taken at face value, these contrasts are puzzling because, in both cases, the (b)-sentence is more verbose than the (a)-sentence but otherwise contributes the same information as the (a)-sentence: on the common assumption that Paris is in France, (1-a) and (1-b) both convey that *John lives in France* while (2-a) and (2-b) both convey that *Everyone who lives in France likes bread*. So what is the source of the contrasts between the (a)-sentences and their minimally different (b)-variants?

As a starting point, we can note that, descriptively, the contrasts at hand are in line with Hurford's 1974 original observation that a disjunction is generally infelicitous if one of the disjuncts entails the other. This observation, which has come to be known as 'Hurford's Constraint,' is stated and further exemplified in (3) (see Gazdar 1979, Chierchia et al. 2012, Singh 2008b, Katzir & Singh 2013, Meyer 2013, Ciardelli & Roelofsen 2017, Westera 2019 among others).

(3) **Hurford's Constraint (HC)**

A disjunction of the form $p \vee q$ is odd at a context c if p contextually entails q or vice versa. *Schematically*: #$p \vee q$ in context c if $p \Rightarrow_c q$ or $q \Rightarrow_c p$.

    a.   #John was born in Paris or (he was born) in France.   HD

    b.   #John was born in France or (he was born) in Paris.   HD

Consider for instance the contrast in (1). The sentence in (1-a) is predicted to be odd by HC for the first disjunct (i.e., *John lives in Paris*) contextually entails the second (i.e., *John lives in France*). On the other hand, the variant of (1-a) in (1-b) manages to escape the scope of HC: the addition of *somewhere else* in (1-b) makes it so that the first conjunct no longer entails the second. Everything else being equal, the contrast in (2) can be described in reference to HC in an analogous fashion. Essentially, the minimal pair in (2) shows that the contrast in (1) reproduces when the relevant

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1 The contrast in (1) has been previously reported in Katzir & Singh (2013: (15)), which attributes the observation to Ida Toivonen. In Section 3.1, we discuss their account of this contrast and explain why it doesn't explain the infelicity of the long-distance variants we introduce below.

disjuncts are embedded in a downard entailing (DE) environment such as the restrictor of the universal quantifier *every*. As a result, HC descriptively captures the oddness of the (a)-sentences above and, subsequently, the observed contrasts with their (b)-variants. In the following, we will refer to infelicitous disjunctions like (1-a) and (2-a) as HURFORD DISJUNCTIONS (HDs) and to their felicitous variants, (1-b) and (2-b), as QUASI HURFORD DISJUNCTIONS (QHDs).

Since Hurford's descriptive generalization, several explanatory accounts of HDs have been put forward in the literature, all of which with the goal of deriving HC from broader considerations about informational oddness. These accounts achieve this goal by appealing to very distinct notions, ultimately grounding the oddness of HDs into different principles of language use or pragmatic phenomena such as (1) Logical Integrity (Anvari 2018, 2019), (2) Mismatching Implicatures (Singh 2010, Meyer 2013, 2014), (3) Non-Redundancy (Katzir & Singh 2013) or (4) Non-Triviality (Schlenker 2009). In Section 2, we review in turn four prominent theories of HC, each of which based on one of these four notions. While all of these theories similarly succeed in explaining genuine instances of HD like (1-a), we show that they make different predictions regarding the contrasts in (1)-(2) and, consequently, that these contrasts can be fruitfully used to compare the general scope of these accounts. Specifically, the contrast in (1) can be used to assess how each of the four accounts deal with the infelicity of HDs and the felicity of QHDs in the most basic cases while the contrast in (2) can be used to explore how these accounts fare in extending this distinction to DE-environments.

Our investigation shows that there are critical differences in the empirical coverage of the four theories investigated and, crucially, that none of them can account for the full set data we discuss: the Logical Integrity approach leaves the contrasts in (1) and (2) unaccounted for; the Implicature-based approach accounts for the contrast in (1), at least in normal conversational situations, but fails to extend to the contrast in (2) in predicting both sentence to be felicitous; finally, both the Non-Redundancy and the Non-Triviality approaches capture, at least on some versions, the contrast between HD and QHD in (1) and encounter no difficulty in generalizing this contrast to DE-environments like (2). As we discuss, however, these approaches quickly run into problems in predicting other variants of QHDs like those in (4) to be infelicitous, contrary to facts.

(4)   **Clausal variants of QHDs**
      a.   John lives in France, or (else) he lives in France but not in Paris. QHD
      b.   John lives in France but not in Paris, or (else) he lives in Paris.   QHD

In Section 3, we move to discuss two existing proposals, the molecular approach by Chierchia (2009) and Katzir & Singh (2013) and the exhaustification-based

approach by Mayr & Romoli (2016), which can be combined with either the Non-Redundancy or the Non-Triviality approach, and we show how both of them solve the overgeneration issues faced by these approaches with cases like (4). We show however that these solutions come with a downside as the resulting theories can no longer account for the infelicity of disjunctive sentences like (5), a phenomena which we dub LONG-DISTANCE HURFORD DISJUNCTIONS (LDHD).

(5) **Long-distance HDs (LDHDs)**

    a.   #John lives in France, or (else) he lives in London or in Paris.   LDHD

    b.   #John lives in London or in Paris, or (else) he lives in France.   LDHD

We conclude in Section 4 by summarising the challenges raised by our data for existing approaches to informational oddness and, more broadly, for the descriptive generalization originally proposed by Hurford.

2   Explanatory Approaches to HC and the QHD Challenge

2.1   Logical Integrity

The first approach we will consider is based on the notion of Logic Integrity (henceforth LI), which has recently been proposed in Anvari (2018, 2019). In essence, LI is a pragmatic principle which aims at capturing the unacceptability of a variety of sentences, part of which were previously subsumed under different theories such as Magri's theory of oddness (Magri 2009, 2011) or *Maximise Presupposition!* (Heim 1991). The idea underlying the formulation of LI is that a sentence is deemed deviant if it contextually entails one of its logically non-weaker alternatives. In sum, this principle forces the logical relation between a sentence and its non-weaker alternatives to be preserved once contextual information is considered, hence the name of 'Logical Integrity'.

(6) **Logical Integrity** (LI, from Anvari 2018: (5))
Let S be a sentence and S' be one of its alternatives. S is infelicitous in a context c if the following two conditions hold:

    a. S does not logically entail S', but

    b. S contextually entails S' in c.

For completeness, we note that, in its final version, LI is associated with an additional 'projection principle', (7), allowing the condition in (6) to apply locally (see Anvari 2019). Importantly, a sentence may obey LI at the global level, but violates it at some local level. Since some of our test cases involve embedded instances of HDs and QHDs, we shall consider independently the global and local versions of

LI, which will turn out to make different predictions in these cases.

(7)   **Projection Principle** (adpated from Anvari 2018: (56a))
       A sentence S is unacceptable in context c if it contains a property- or
       proposition-denoting constituent π which violates Logical Integrity in its
       local context with respect to one of its alternatives π'.

As discussed in Anvari (2018: 2:4), LI can account for the deviance of genuine
instances of HDs. Consider for instance the sentence in (1-a). This sentence
contextually entails one its alternatives, namely *John lives in France*, yet it does
not logically entail it. It is so because the entailment relation between (1-a) and
John lives in France only holds on the assumption that Paris is in France, which is
obviously a contextual assumption, not a logical truth. As a result, (1-a) is correctly
predicted to be infelicitous by LI. More generally, we can observe that any simple
disjunctive sentence of the form $\ulcorner p^+$ or $p\urcorner$ or $\ulcorner p$ or $p^+\urcorner$, where p^+ contextually but
not logically entails p, violates LI and is thus predicted to be infelicitous by (6).

(1-a)   #John lives in Paris or in France.   ✓LI

        a.   Logic: (1-a) $\not\Rightarrow$ John lives in France
        b.   Context: (1-a) $\Rightarrow_c$ John lives in France

We observe, however, that LI is unable to distinguish QHDs from HDs. To illustrate,
consider first the instance of QHD in (1-b). Just like (1-a), (1-b) has *John lives in
France* has an alternative. As before, this alternative is contextually, yet not logically
entailed by its base sentence. Hence, by LI, (1-b) is also predicted to be deviant, this
time contrary to facts.

(1-b)   John lives in Paris or somewhere else in France.   ✗LI

        a.   Logic: (1-b) $\not\Rightarrow$ John lives in France
        b.   Context: (1-b) $\Rightarrow_c$ John lives in France

Turning now to the contrast in (2), LI makes different predictions in these cases
depending on whether one assumes that the principle applies only globally, or also
locally, via its projection principle. However, in either case, the contrast is left
unexplained. To see this, suppose first that LI applies globally, i.e., at the root level.
At that level, LI is obeyed because both (2-a) and (2-b) logically entail the alternative
Everyone who lives in France likes bread, and therefore both sentences should be
fine. Alternatively, suppose that LI also applies locally, i.e., in the restrictor of *every*.
The sentences embedded in the restrictor of *every* — i.e., *x lives in Paris or (x lives
somewhere else) in France* — contextually, yet not logically entail the alternative *x
lives in France*, and consequently both (2-a) and (2-b) should be deviant.

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In sum, the Logical Integrity approach accounts for the infelicity of (1-a) and, on its local version, for the infelicity of (2-a). However, it fails to capture the contrast in (1) and, on both its versions, for the contrast in (2) in predicting either both (2-a) and (2-b) to be good (Global version), or else both of them to be bad (Local version).

2.2 Mismatching Implicatures

The second approach is based on the long-standing observation that the utterance of a disjunctive sentence of the form ⌜p or q⌝ gives rise to speaker-oriented ignorance inferences about p and about q (e.g., Gazdar 1979).[2] A common way to analyze these inferences is to treat them as Scalar Implicatures (SIs) and derive them either from pragmatic principles (a.o., Gazdar 1979, Sauerland 2004, Fox 2007, 2016), or in the grammar (Meyer 2013, 2014). On the pragmatic account, these implicatures can be derived for instance by assuming some version of Grice's Cooperation Principle like (8).

(8)   **Cooperation Principle (à la Fox 2007)**
        Let S be any sentence used by a speaker s at context c, and $R = \{r_1, \ldots, r_n\}$ be the set of propositions relevant at c. Then, for any proposition $r_i \in R$ whose truth-value is left undetermined by $[[S]]$, we get $I_s(r_i)$.

Following (8), in hearing a sentence S, hearers derive ignorance inferences about all sentences that are relevant to the purpose of the conversation, but that are not logically entailed by S. Applying this principle to a disjunctive sentence like (9) allows us to generate the ignorance inferences we are looking for:

(9)   John speaks French or Japanese.

        a. $R = \{$John speaks French, John speaks Japanese, $\ldots\}$
        b. $[[(9)]] \not\Rightarrow [[$John speaks French$]]$
        c. $[[(9)]] \not\Rightarrow [[$John speaks Japanese$]]$

        By Cooperation: $I_s($John speaks French$)$, $I_s($John speaks Japanese$)$

A similar outcome obtains on the grammatical account of ignorance inferences. On this account, it is hypothesized that assertions are covertly modalized by an operator K which universally quantifies over the speaker's doxastic alternatives, hence the notation K_s. This hypothesis, together with the presence of the exhaustivity operator EXH at root level, permits to derive the same ignorance implicatures as above with the parse given in (10) (we refer the reader to Meyer (2013, 2014) for discussion and technical detail). For simplicity, we use FRENCH and JAPANESE here

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2 In the following, we use $I_s(p)$ as an abbreviation for 'the speaker s is ignorant whether p'. As usual, for any agent x, $I_x(p)$ holds if and only if x doesn't belive p and x doesn't believe $\neg p$.

as abbreviated forms for the full sentences *John speaks French* and *John speaks Japanese*, respectively. As usual, the domain of quantification of EXH is taken to be restricted to propositions that are relevant.

(10)   EXH [K_s John speaks French or Japanese]

      a.   Alternatives = {[K_s French], [K_s Japanese], [K_s French and Japanese]}

      b.   Implicatures: ¬[K_s French], ¬[K_s Japanese], ¬[K_s French and Japanese]

      c.   Outcome: (10) ⇔ K_s[French or Japanese]∧I_s[French]∧I_s[Japanese]

Crucially, proponents of both approaches have argued that, unlike genuine SIs, the ignorance implicatures associated with simple disjunctive sentences cannot be cancelled in normal speech situations as neither of the independent disjuncts can be pruned from the set of relevant propositions.[3] As Singh (2010) discusses, this proposal is supported for instance by the infelicity of sentences like (11):

(11)   #I speak French or Japanese.

On the contextual assumption that everyone knows what languages he speaks, the sentence in (11) gives rise to ignorance implicatures that conflict with common knowledge. The fact that (11) is perceived as infelicitous (unless one removes the above assumption) suggests that this conflict cannot be avoided and, consequently, that the ignorance inferences responsible for this conflict cannot be cancelled.

Following up on these observations, Singh (2010) and Meyer (2014) show that the mandatory presence of ignorance inferences can explain the oddness of HDs for basic cases like (1-a). Regardless of the theory of SIs one adopts, a sentence like (1-a) is predicted to give rise to the implicature that the speaker is ignorant whether John lives in France, which in turn contradicts the contextual entailment of (1-a) that the speaker believes that John does.

(1-a)   #John lives in Paris or in France.   ✓SI

      a.   Contextual entailment: K_s(John lives in France)

      b.   Ignorance implicatures: I_s(John lives in France), I_s(John lives in Paris)

This approach further accounts for the contrast between HD and QHD in (1). The reason for this is that the ignorance implicatures associated with the sentence in (1-b) are, by contrast, consistent with all its contextual entailments. Specifically, the sentence in (1-b) is predicted to convey that the speaker believes that John lives in France, while implicating that the speaker is ignorant as to where in France John

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3 For explicit statements concerning why disjunctions obligatorily give rise to ignorance inferences in run-of-the-mill contexts, see Gazdar (1979), Simons (2001), Fox (2007), Singh (2008a), Fox & Katzir (2011), Marty & Romoli (2021a,b), among others.

lives, consistent with speakers' intuitions.

(1-b)   John lives in Paris or somewhere else in France.   ✓SI
   a.   Contextual entailment: K_s(John lives in France)
   b.   Ignorance implicatures:
        I_s(John lives in Paris), I_s(John somewhere else in France)

However, the implicature-based approach does not extend to the contrast in (2): since both (2-a) and (2-b) logically entail that *Everyone in Paris likes bread* and that *Everyone in France likes bread*, no ignorance inferences are predicted to arise on the basis of these alternatives on either accounts. While this correctly accounts for the felicity of (2-b), it leaves the infelicity of (2-a) unaccounted for.

(2-a)   #Everyone who lives in Paris or in France likes bread.   ✗SI
   a. $[[(2\text{-}a)]] \Rightarrow [[$Everyone who lives in Paris likes bread$]]$
   b. $[[(2\text{-}a)]] \Rightarrow [[$Everyone who lives in France likes bread$]]$
   c.   Ignorance implicatures: ∅

We note, in passing, that there is in a fact another issue for this approach even for basic instances of HDs. It has been observed as early as Grice (1975) (see also Fox 2014) that the ignorance inferences normally drawn from a disjunction can be suspended if it is presupposed that speakers are not going to provide all of the relevant information that they have available. A classical example of such semi-cooperative contexts are the so-called treasure hunt scenarios. In these scenarios, it is common knowledge that the speaker is fully knowledgeable but is only allowed to provide partial information to the hearers so as to not defeat the purpose of the treasure hunt. This type of scenario is exemplified below:

(12)   *Context: John hid a chocolate bunny for his children: the first who finds the chocolate bunny wins it. The chocolate bunny could be anywhere inside or around the house. To help them out, John gave them a hint as to where to search, with the common understanding that this hint reveals only part of the relevant information available to him. John says:*
       The chocolate bunny is in the dinning-room or in the garden.
   a. $\not\Rightarrow I_s$(The chocolate bunny is in the dinning-room)
   b. $\not\Rightarrow I_s$(The chocolate bunny is in the garden)

The fact that John's hint is perceived as felicitous, even though John is known to be knowledgeable about where the chocolate bunny is, suggests that the ignorance implicatures normally arising from disjunctive sentences are suspended in this treasure hunt context (if it were not so, John's utterance would be deviant). We

observe however that the contrast between HD and QHD reproduces in this same context and therefore in the absence of ignorance implicatures.[4]

(13)   *Same context as in (12), where John says:*
    a.   #The chocolate bunny is in the dinning-room or in the house.
    b.   The chocolate bunny is in the dinning-room or somewhere else in the house.

In sum, both the pragmatic and the grammatical account to ignorance implicatures predict basic instances of HDs like (1-a) to be deviant in normal conversations: these sentences give rise to ignorance implicatures that contradict the contextual entailment that the speaker believes the weaker disjunct to be true. However, neither accounts can explain why such contrasts reproduce in cases where ignorance inferences are absent, whether in DE-environments like (2), or in semi-cooperative contexts like the one in (12)-(13).

2.3   Non-Redundancy

The third approach is based on an elaboration of Grice's 1975 *Maxim of Brevity* and relates the infelicity of HDs to a general preference for non-redundancy. The idea is that, if two sentences S and S' have the same contribution in context and S' is structurally simpler than S, then the speaker should favor S' over S so as to avoid unnecessary prolixity. Following Meyer (2013) and Mayr & Romoli (2016), we can make this idea more precise by formalizing it as in (14), where the intended notion of simplification is that proposed in Katzir (2007) (see also Katzir & Singh 2008, Fox & Katzir 2011).[5]

(14)   **Non-Redundancy** (NR)
    A sentence S cannot be used in context c if there is a sentence S' such that

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4 Uli Sauerland suggested to us another explanation in terms of conflicting pretense strategy: in treasure hunt scenarios, in uttering $\phi \vee \psi$, speakers *pretend to be ignorant* about ϕ and about ψ. On this view, a tension would still exist in (13) for the speaker would pretend to be ignorant as to whether the chocolate bunny is in the house, while at the time expressing his belief that the chocolate bunny is in the house. This is an interesting alternative explanation. We note however that, even though this may point to an odd pretense strategy, it is not quite a contextual contradiction.

5 Some researchers have suggested to rephrase the condition in (14) so as to allow non-redundancy to be evaluated incrementally (e.g. Fox 2008). On this view, speakers evaluate whether a constituent is redundant as they process the sentence from left to right, regardless of what comes after that constituent. We do not review the motivations for this proposal in full here. For what is relevant to us, the incrementalized version of (14) is a non-starter as it fails to capture the symmetric distribution of HD-effects: it correctly predicts a sentence like *#John lives in France or in Paris* to be infelicitous, but incorrectly predicts its symmetric variant, *#John lives in Paris or in France*, to be felicitous. We therefore leave this proposal aside in the following.

S' is a simplification of S and S' is contextually equivalent to S in c.

    a. S' is a simplification of S if S' can be derived from S by replacing nodes in S with their subconstituents.

    b.   LFs S and S' are contextually equivalent with respect to context c iff $\{w \in c : [[S]](w) = 1\} = \{w \in c : [[S']](w) = 1\}$

In a nutshell, the Non-Redundancy (henceforth NR) condition in (14) compares the global meanings of two potential utterances and states that structurally less complex utterances are to be preferred over equivalent but structurally more complex competitors because the former are more economical than the latter. We shall note however that there is no general agreement in the literature regarding the points in the structure-building process at which NR is to be checked or the characterization of the set of alternatives entering its evaluation. As discussed in Katzir & Singh (2013), the preference for non-redundancy can also be conceptualized as a ban against redundant constituents and be defined as in (15) (modeled after Katzir & Singh 2013, Fox 2008). This alternative version, let us call it CNR, departs from (14) in two noticeable ways: (i) non-redundancy is now checked at the level of each constituent, and (ii) the simpler alternatives to a given constituent X are restricted to those alternatives that can be derived from X by replacing X with one of its subconstituents. Given the differences between these two versions, we shall consider them both independently.

(15)   **Constituent-Based Non-Redundancy** (CNR)
      A sentence S cannot be used in context c if there is any constituent X in S that is contextually equivalent to one of X's subconstituents.
      Technically: #$[X]$ if X has a subconstituent Y such that $[X] \equiv_c [Y]$.

NR and CNR similarly accounts for the oddness of HDs like (1-a) or (2-a) since, by definition, the disjunction in a HD is equivalent to the weaker disjunct alone and, consequently, to one of its subconstituents. Thus, a sentence like (1-a) is redundant because, given common knowledge, it conveys the same information as the second disjunct alone, which qualifies as a contextually equivalent, simpler alternative to (1-a) in the technical sense of both (14) and (15). The same reasoning applies to (2-a) with some minor differences between NR and CNR regarding the evaluation process. Specifically, on NR, (2-a) is predicted to be inappropriate because of the contextually equivalent simplification *Everyone who lives in France likes bread*; on CNR, it is so because the disjunction embedded in the scope of *every* is contextually equivalent to its second disjunct. Setting these differences aside, we can observe that any sentence containing a disjunction of the form $\ulcorner p^+ \text{ or } p \urcorner$ or $\ulcorner p \text{ or } p^+ \urcorner$, where p^+ contextually entails p, violates NR/CNR and, therefore, its use is deemed inappropriate by (14)/(15).

(1-a)   #John lives in Paris or in France.   ✓NR, ✓CNR

      a.   Simplifications = {John lives in Paris, <u>John lives in France</u>}
      b.   Subconstituents = {John lives in Paris, <u>John lives in France</u>}
      c.   Equivalence: (1-a) $\Leftrightarrow_c$ <u>John lives in France</u>

However, NR and CNR make different predictions regarding the felicity of QHDs. On the one hand, NR predicts QHDs to be unacceptable: just like (1-a), (1-b) should compete with *John lives in France* and, just like (2-a), (2-b) should compete with *Everyone who lives in France likes bread.* In fact, it follows from NR that the set of competing alternatives to a QHD should always be a superset of the set of competing alternatives to the HD it relates to. As a result, NR cannot formally distinguish QHDs from HDs and fail to capture the relevant contrasts. On the other hand, CNR avoid these unwarranted predictions for (1-b) and (2-b) since there is no constituent in these sentences that is contextually equivalent to one its subconstituents. Thus, CNR penalizes redundant disjuncts but, as Katzir & Singh (2013: p.206) put it, 'it does not penalize undue complexity in some global sense.'

(1-b)   John lives in Paris or somewhere else in France.   ✗NR, ✓CNR

      a.   Simplifications = {John lives in Paris, John lives somewhere else in France, John lives somewhere in France, <u>John lives in France</u>}
      b.   Subconstituents= {John lives in Paris, John lives somewhere else in France}
      c.   Equivalence: (1-b) $\Leftrightarrow_c$ <u>John lives in France</u>

Despite its immediate success, CNR fails to account for the felicity of QHDs in full generality. Consider for instance the following clausal variants of (1-b):

(4)   **Clausal variants of QHDs**

      a.   John lives in Paris, or (else) he lives in France but not in Paris.
      b.   John lives in France but not in Paris, or (else) he lives in Paris.

Just like (1-b), the QHDs in (4) are contextually equivalent to the simpler clause *John lives in France.* Crucially, in these variants, this clause is a subconstituent of the base sentences: it corresponds to the first clause of the embedded conjunction. These variants are thus predicted by CNR to be inappropriate, contrary to facts.

(4-a)   John lives in Paris, or (else) he lives in France but not in Paris.   ✗CNR

      a.   Subconstituents = {John lives in Paris, John lives in France but he doesn't live in Paris, <u>John lives in France</u>, John doesn't live in Paris}
      b.   Equivalence: (4-a) $\Leftrightarrow_c$ <u>John lives in France</u>

In sum, NR correctly predicts HDs to be infelicitous but this prediction incorrectly carries out to QHDs, overgenerating infelicity for QHDs and, consequently, leaving the contrasts in (1) and (2) unaccounted for. In this regard, CNR improves upon NR in capturing both contrasts: using a more restrictive notion of alternatives, CNR can still predict the infelicity of (1-a) and (2-a) while taking (1-b) and (2-b) out of its scope of application. As we explained, however, CNR does not account for the felicity of QHDs in full generality and encounters similar overgeneration issues as NR in predicting other QHD-cases like (4) to be infelicitous.

2.4 Non-Triviality

The fourth and last approach is based on the notion of triviality (Stalnaker 1974, 1978, van der Sandt 1992, Singh 2008a, Schlenker 2009, Mayr & Romoli 2016). The idea behind this approach is that a sentence is deemed infelicitous if some part π of it provides only trivially true or trivially false information in π's local context, (16).

(16) **Non-Triviality** (NT)
A sentence S cannot be used in a context c if part π of S is entailed or contradicted by the local context of π in c.

NT needs to be supplied with a theory of local contexts. As it has been observed in the literature, in order to fully capture the infelicity of HDs, one must adopt a symmetric account of local contexts in disjunctions along the lines of (17) (see Schlenker 2009 among others). The reason for that is simply that HDs are deviant regardless of the linear positions of the disjuncts in the disjunction (see examples in (3)), a symmetry that cannot be captured by an asymmetric account.[6]

(17) **Local contexts for disjunction: symmetric account**
a. The local context of p when $p \vee q$ is uttered in context c is $c \cap [[\neg q]]$.
b. The local context of q when $p \vee q$ is uttered in context c is $c \cap [[\neg p]]$.

This approach accounts for the infelicity of simple instances of HDs like (1-a). Following (17), the local context for the first disjunct *John lives in Paris* is one which entails the negation of the second disjunct *John lives in France*. As a result, the first disjunct of (1-a) is trivially false in its local context, and so (1-a) is predicted to be infelicitous by NT. Generalizing a bit, we can observe that any sentence containing

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6 On an asymmetric account of local context in disjunctions, it is assumed that the local context of p when $p \vee q$ is uttered in context c is c itself. For simple disjunctions, the predictions of this account are similar to those of incremental non-redundancy (see fn.5 above). In particular, it predicts the infelicity of HDs like #*John is in France or in Paris*, but it fails to predict the infelicity of its symmetric variant, #*John is in Paris or in France*, since in the latter case, *John lives in Paris* is not trivial in its local context, which corresponds here to the global context.

a disjunction of the form $\ulcorner p^+$ or $p\urcorner$ or $\ulcorner p$ or $p^+\urcorner$, where p^+ contextually entails p, is predicted to be infelicitous by NT since p is entailed by p^+ and at the same time, contradicted in p^+'s local context, which entail $\neg p$.

(1-a)   #John lives in Paris or in France.   ✓NT

      a.   Local context for the 1st disjunct: $c' = c \cap \neg[[\text{John lives in France}]]$
      b.   Triviality check: $c' \cap [[\text{John lives in Paris}]] = \varnothing$

This approach also accounts for the contrast between (1-a) and (1-b). In (1-b), the local context for the first disjunct is one in which *John lives somewhere else in France* is false, i.e., one in which either John lives in Paris or he doesn't live in France. Therefore, the first disjunct is neither trivially false, nor trivially true in its local context. Similarly, the local context for the second disjunct is one in which *John lives in Paris* is false, i.e., one in which John doesn't live in Paris. Thus, the second disjunct is also neither trivially false, nor trivially true in its local context.

(1-b)   John lives in Paris or somewhere else in France.   ✓NT

      a.   Local context for the 1st disjunct:
         $c' = c \cap \neg[[\text{John lives somewhere else in France}]]$
         Triviality check: $c' \cap [[\text{John lives in Paris}]] \neq \varnothing$
      b.   Local context for the 2nd disjunct:
         $c' = c \cap \neg[[\text{John lives in Paris}]]$
         Triviality check: $c' \cap [[\text{John lives somewhere else in France}]] \neq \varnothing$

Finally, this approach correctly predicts the contrast between HDs and QHDs in (1) to reproduce in DE-environments like (2). Specifically, in sentences such as (2-a) or (2-b), NR has to be checked at embedded levels. In (2-a), the disjunctive clause embedded in the restrictor of *every* — i.e., *x lives in Paris or (x lives) in France* — violates NT because the first disjunct is trivially false in its local context, exactly as in (1-a). By contrast, in (2-b), the disjunctive sentence embedded in the restrictor of *every* — i.e., *x lives in Paris or (x lives) somewhere else in France* — obeys NT: neither disjunct is trivially false (or true) in its local context, exactly as in (1-b).

    We observe however that, on common assumptions about local contexts in conjunctions, NT incorrectly predicts the clausal variants of QHDs in (4) to be infelicitous. To explain this prediction, consider first the standard account of local contexts in conjunctions stated in (18).

(18)   **Local contexts for conjunction**

      a.   The local context of p when $p \wedge q$ is uttered in context c is c.
      b.   The local context of q when $p \wedge q$ is uttered in context c is $c \cap [[p]]$.

The combination of (17) and (18) permits us to determine the local context of the second embedded conjunct in (4-a) and (4-b). Specifically, the local context of *John does not live in Paris* in these sentences is one in which *John lives in France* is true (by (18)) while *John lives in Paris* is false (by (17)), as exemplified below for (4-a). Therefore, *John does not live in Paris* is trivially true in its local context and, consequently, (4-a) and (4-b) are both predicted to be infelicitous by NT.

(4-a)   John lives in Paris, or (else) he lives in France but not in Paris.   ✗NT

      a.   Local context for the 2nd disjunct:
            $c' = c \cap \neg[\![\text{John lives in Paris}]\!]$
      b.   Local context for the 2nd embedded conjunct:
            $c'' = c' \cap [\![\text{John lives in France}]\!]$
      c.   Triviality check: $c'' \cap \neg[\![\text{John lives in Paris}]\!] = \varnothing$

In sum, NT predicts a sentence to be deviant if that sentence is trivially false or trivially true in its local context. On a symmetric account of local contexts in disjunctions, this theory captures the contrasts between HDs and QHDs in both (1) and (2). However, it does not capture the felicity of QHDs in full generality and encounters similar overgeneration issues as NR and CNR in predicting other QHD-cases like (4) to be infelicitous.

3   Existing Solutions and the LDHD Challenge

In the previous section, we have discussed four major explanatory approaches to HC and shown that none of them accounts for the contrasts between HDs and QHDs in full generality: the Logical Integrity approach leaves the contrasts in (1) and (2) unaccounted for; the Implicature-based approach accounts for the contrast in (1) in normal conversational situations, but fails to extend to the contrast in (2); the Non-Redundancy and the Non-Triviality approaches capture, on some versions, the contrasts in (1) and (2) but overpredict infelicity for the QHD-variants in (4).

In this section, we discuss in turn two proposals to restrict the scope of application of two most promising approaches, Non-Redundancy and Non-Triviality. While both proposals are found to solve the overgeneration issues encountered by these approaches, it is shown that they also results in novel undergeneration issues: once these proposals are adopted, the resulting theories can no longer account for the infelicity of Long-distance Hurford Disjunctions (LDHDs).

(5)   **Long-distance HDs**
      a.   #John lives in France, or (else) he lives in London or in Paris.
      b.   #John lives in London or in Paris, or (else) he lives in France.

3.1 Moving to the Molecular Level

Partly in response to the QHD challenge, Katzir & Singh 2013 (see fn.1), building on Chierchia 2009, argue that non-redundancy is checked at an intermediate level of the structure-building process, namely the 'molecular' level of binary operators, where grammar is hypothesized to interface with the context. Katzir & Singh's (2013) non-redundancy condition (henceforth MNR) is stated in (19) (where O is a binary operator taking arguments α and β, and c is the global context here).[7]

(19) **Molecular Non-Redundancy** (MNR, Katzir & Singh 2013: (27))
A sentence S is deviant if S contains a node γ such that
$[[\gamma]] = [[O(\alpha,\beta)]]$ and $[[O(\alpha,\beta)]] \equiv_c [[\zeta]]$, where $\zeta \in \{\alpha,\beta\}$.

In short, MNR requires that the meaning of a binary operator applied to its arguments be contextually distinct from the meaning of either of its arguments taken independently. This amendment preserves the good predictions of CNR for the basic contrasts in (1) and (2); crucially, it improves upon CNR in capturing further the felicity of clausal QHDs, as illustrated below for (4-a).

(4-a) $[_{\gamma_1} [_\alpha$ John lives in Paris], or (else)
$[_{\gamma_2} [_\beta$ he lives in France] but $[_\delta$ he does not live in Paris]]]   ✓MNR
  a.   For $[[\gamma_1]] = [[OR(\alpha,\gamma_2)]]$:
       for all $\zeta \in \{\alpha,\gamma2\}$, $[[O(\alpha,\gamma_2)]] \not\equiv_c [[\zeta]]$
  b.   For $[[\gamma_2]] = [[AND(\beta,\delta)]]$:
       for all $\zeta \in \{\beta,\delta\}$, $[[O(\beta,\delta)]] \not\equiv_c [[\zeta]]$

The problem, however, is that MNR fails to predict the infelicity of our novel cases involving LDHDs, as illustrated below for (5-a).[8] The reason for that is that, in contrasts to HDs, the offending Hurford disjuncts in LDHDs (e.g., *John lives in France* and *John lives in Paris*) are not arguments of the same disjunction operator and therefore, at the levels at which MNR operates, the redundancy goes unnoticed.

(5-a) #$[_{\gamma_1} [_\alpha$ John lives in France], or (else)
$[_{\gamma_2} [_\beta$ he lives in London] or $[_\delta$ he lives in Paris]]]   ✗MNR
  a.   For $[[\gamma_1]] = [[OR(\alpha,\gamma_2)]]$:
       for all $\zeta \in \{\alpha,\gamma2\}$, $[[O(\alpha,\gamma_2)]] \not\equiv_c [[\zeta]]$
  b.   For $[[\gamma_2]] = [[OR(\beta,\delta)]]$:
       for all $\zeta \in \{\beta,\delta\}$, $[[O(\beta,\delta)]] \not\equiv_c [[\zeta]]$

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7 Katzir & Singh (2013) argue that MNR needs to make reference to the global context in the case of disjunctions, but to local contexts in some other cases that are not relevant here.

8 See also Mayr & Romoli 2016 for a discussion of further problems encountered by this approach beyond cases involving disjunction.

In sum, the molecular view correctly predicts phrasal and clausal instances of QHDs to be felicitous, but these predictions incorrectly extend to LDHDs. Thus, this refinement of the NR approach does not provide, as it stands, a satisfying account of the variety of HDs discussed in this paper. In the next subsection, we turn to discuss a different direction which proposes to explain the felicity of QHDs and related cases as a consequence of exhaustification.

3.2   Adding Exhaustification

Consider again the case of clausal QHD in (4-a), repeated below. Taken at face value, this example looks very similar to the one in (20) discussed in Mayr & Romoli (2016), the felicity of which is also challenging for redundancy-based and triviality-based accounts of informational oddness. In particular, as Mayr & Romoli discuss, (20) is predicted to be odd on these accounts because of the redundancy/triviality of the clause 'he doesn't (live in France)' embedded in the second disjunct.

(4-a)   John lives in Paris, or (else) he lives in France but not in Paris.

(20)   John lives in France, or he doesn't but Sue does.

In this subsection, we show that Mayr & Romoli's (2016) solution to the case in (20) extends to the one in (4-a) and therefore offers an account for the felicity of clausal QHDs. As we explain, however, their account similarly extends to LDHD cases like (21), now incorrectly predicting these examples to be felicitous.

(21)   #John lives in France, or (else) Sue lives in France or John lives in Paris.

To illustrate these points in turn, let us first consider the gist of Mayr & Romoli's (2016) solution. In a nutshell, Mayr & Romoli make the novel observation that the exhaustified meaning of (20), in contrast to its literal meaning, does not suffer from redundancy or triviality and, therefore, is not predicted to be odd. Based on this observation, they propose that sentences like (20) are rescued from oddness due to extra work of exhaustification, and move on to show how this solution can be integrated with either the NR or the NT approach. Starting with the former, Mayr & Romoli show that the clause 'he doesn't (live in France)' in (20) becomes non-redundant when the simpler alternative to (20) in (22) is also exhaustified, as the exhaustification of (20) is not equivalent to that of (22), as illustrated in (23). In particular, note that (22) has the non-trivial implicature that *John and Sue do not both live in France* while (20) only has a vacuous implicature (i.e., the negation of the contradictory alternative *John lives in France and he doesn't and Sue does*). In other words, (20) manages to avoid redundancy because (20) and its simpler alternatives like (22) are all interpreted in the scope of a covert exhaustification

operator and, in such cases, exhaustification breaks contextual equivalence.

(22)   John lives in France, or Sue does.

(23)   a.   ᴇxʜ[(20)]⇔(John lives in France, or he doesn't but Sue does)∧¬(John
               lives in France ᴀɴᴅ he doesn't but Sue does)
               ⇔(John lives in France, or he doesn't but Sue does)
        b.   ᴇxʜ[(22)]⇔(John lives in France, or Sue does)∧¬(John lives in France
               ᴀɴᴅ Sue does)
        c.   Equivalence: (23-a) ⇎$_c$ (23-b)

Turning now to the NT approach, recall that (20) was predicted to be odd on its
literal meaning because the clause 'he doesn't (live in France)' is trivially true in its
local context. The situation changes however if the meaning (20) is exhaustified.
On an approach to local contexts à la Schlenker (2009), the local context of 'he
doesn't (live in France)' in the exhaustified version of (20) above becomes simply
the global context and, relative to the global context, this clause is neither trivially
true, nor trivially false.[9] As a result, when (20) is interpreted with exhaustification,
no triviality arises and this sentence is thus predicted to be felicitous, as expected.

   This line of explanation readily extends on both approaches to clausal QHDs
like (4-a), which are also predicted to be felicitous when exhaustification is taken
into account. On the NR approach, it is so because, just as before, the exhaustified
version of (4-a) in (24-a) is not equivalent to its exhaustified simplification in (24-b).
In particular, the exhaustified meaning of (4-a) is equivalent to its plain meaning,
while (24-b) has a non-trivial implicature which, together with the truth of ᴇxʜ's
prejacent, conveys that John lives in France but not in Paris. Similarly, in the
exhaustified version of (4-a) in (24-a), the local context of the last conjunct does
not entail that John doesn't live in Paris. Hence, this conjunct is non-trivial and
the whole sentence is predicted to be felicitous on the NT approach.

(24)   a.   ᴇxʜ[(4-a)]⇔(John lives in Paris, or he lives in France but not in Paris)
               ∧¬(John lives in Paris, ᴀɴᴅ he lives in France but not in Paris)
               ⇔(John lives in Paris, or he lives in France but not in Paris)
        b.   ᴇxʜ[John lives in Paris or in France]
               ⇔(John lives in Paris or in France)∧¬(John lives in Paris ᴀɴᴅ in

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9 We refer the reader to Mayr & Romoli 2016 for the details. In a nutshell, the key observation here is
that, when a disjunctive sentence is *not* exhaustified, we can ignore the worlds in which the first
disjunct is true when evaluating the second disjunct for the whole disjunction is true anyway in
these worlds. On the other hand, when a disjunctive sentence *is* exhautisfied, these worlds can
no longer be ignored as we need now need to verify that the two disjuncts aren't both true in
these worlds. As Mayr & Romoli (2016) emphasize, exhaustification affects the calculation of local
contexts even if the result of exhaustification is itself vacuous, as it is the case in (23-a) for instance.

France)
$\Leftrightarrow$(John lives in France but not in Paris)

   c.   Equivalence: (24-a) $\not\Leftrightarrow_c$ (24-b)

The problem with this proposal is that, when we turn to the LDHD case in (21), it predicts that we should be able to apply the very same strategy to rescue this variety of HDs from oddness, contrary to facts.[10] On the NR approach, this prediction follows because, in the same way as above, the exhaustification of (21) in (25-a) is not equivalent to its exhaustified simplification in (25-b): the former conveys that it's not the case that John lives in Paris and Sue lives in France, while the latter simply entails that John and Sue do not both live in France. Therefore, the sentence is not predicted to be infelicitous by NR. Similarly, on the NT approach, in the exhaustified version of (21), the local context of the last conjunct does not entail the negation of the first disjunct, i.e., that John doesn't live in France. Therefore, the sentence is not predicted to be infelicitous by NT either.

(25)   a.   EXH[(21)]$\Leftrightarrow$(John lives in France, or Sue lives in France or John lives in Paris)$\wedge\neg$(John lives in France AND Sue lives in France AND John lives in Paris)$\Leftrightarrow$(John lives in France or Sue lives in France)$\wedge\neg$(Sue lives in France AND John lives in Paris)

    b.   EXH[John lives in France, or Sue does]$\Leftrightarrow$(John lives in France or Sue lives in France)$\wedge\neg$(John lives in France AND Sue lives in France)

    c.   Equivalence: (25-a) $\not\Leftrightarrow_c$ (25-b)

In sum, Mayr & Romoli's (2016) proposal, originally devised to account for the felicity of sentence like (20), offers a solution to the ovegeneration issue raised by clausal QHDs for the NR and the NT approaches. The problem, as we showed, is that adopting this solution also leads to novel undergeneration issues for these two approaches: the resulting theories no longer distinguish LDHDs from QHDs and incorrectly predict the former to be felicitous as well.

4 Conclusion

Fifty years after Hurford's original observation, the challenge of explaining the oddness of disjunctions with entailing disjuncts remains. As we showed, none of

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10 This is not the only challenge for Mayr & Romoli's (2016) proposal. As the authors themselves point out, their approach only offers a partial account of HDs to begin with. The reason for that is that, in order to handle some of their critical cases, Mayr & Romoli need to assume that the disjuncts in a disjunction are asymmetric (this can be implemented by adopting the incrementalized version of NR or by combining NT with an asymmetric account of local contexts in disjunctions). Therefore, on their proposal, a HD like #*John lives in Paris or in France* is not predicted to be odd in the first place. We put this issue aside here to focus on the challenge raised by LDHDs.

the explanatory approaches we are aware of can successfully account for HDs and their varieties, and it is unclear whether, and if so how, the principles underlying these approaches can be amended to capture the infelicity of HDs and LDHDs while leaving QHDs out of their scope of application. In particular, we have shown that recent proposals suggesting to modify the level at which those principles would apply or arguing for exhaustification as a rescue strategy do not offer a satisfying solution to the main challenges we identified: the resulting theories provide a general account for QHDs but loose the account of LDHDs.

More generally, our data challenge the classical description of Hurford disjunctions which the formulation of HC is based upon. Specifically, instances of LDHDs such as (5-a) are not captured by HC for neither of the disjuncts in the matrix disjunction entails the other, and similarly in the local disjunction.

(5-a)   #John lives in France, or (else) he lives in London or in Paris.   LDHD

On the face of it, it is tempting to try and give a more general version of HC of the sort in (26) by requiring that, in such disjunctive constructions, none of the disjuncts entails any other disjunct at any level of the sentence.

(26)   **Generalized Hurford's Constraint**
Let S be a sentence formed by hierarchically organized disjuncts and let $D = \{d_1, d_2, \ldots, d_n\}$ be the set of independent disjuncts occurring in S. S is odd at a context at a context c if, for any $d, d' \in D$, $d \Rightarrow_c d'$ or $d' \Rightarrow_c d$.

Clearly, this generalized version of HC would now descriptively cover LDHDs. Yet this description does not seem to be general enough. Mandelkern & Romoli (2018) show for instance that similar infelicity effects reproduce with conditionals, as illustrated in (27), and we note here that such effects reproduce in hybrid cases like (28) where the second disjunct involves a (non-Hurfordian) conditional in place of a disjunction.

(27)   **Hurford Conditional**
#If John is not in Paris, he is in France.

(28)   **Long-Distance Hurford Hybrid**
#John is in France or, if he is not in London, he is in Paris.

We conclude that the varieties of HDs discussed in this squib are challenging for existing approaches to informational oddness and, as we explained, it is an open question how to even formulate the right descriptive generalization that would subsume all of these cases under one roof.

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